

April 2014 - A Quarterly Publication

## Ames - 75 years of world leadership in science and technology

On Aug. 4, 1939, the U.S. Senate passed a bill that included funding for a new National Advisory Committee for Aeronautics (NACA) research station, where advanced research facilities would be built to develop future flight technologies. Almost 20 years later, the NACA research laboratory became part of the National Aeronautics and Space Administration. Today, 75 years after its inception, NASA's Ames Research Center at Moffett Field, Mountain View, Calif., continues its world leadership in science and technology. As part of our celebration to commemorate Ames and its glorious past, the Astrogram will publish a series of feature stories depicting past research projects and facilities. To all those who have been an integral part of our past and present, Happy 75th anniversary Ames!

See historic Ames photos on page 6



## Atmospheric science: NASA Ames' early contribution to our home planet (part one)



The prospect of war was the driving force for Ames' first research authorization, a study to protect airplanes from the hazards of icing while flying. In 1941, Ames researchers flew a Curtiss C-46 (left) as a flying de-icing research laboratory, to study atmospheric conditions. Women are pictured in the photo, one in the cockpit and two standing with tools in hand.

NACA photo

BY RUTH DASSO MARLAIRE

Atmospheric research and airborne science campaigns have been strengths of NASA's Ames Research Center, nearly since its inception as a National Advisory Committee for Aeronautics (NACA) laboratory in 1939. The prospect of war was the driving force for Ames' first research authorization, a study to protect airplanes from the hazards of icing while flying.

In 1941, Ames researchers flew a Curtiss C-46 as a flying de-icing research laboratory to study atmospheric conditions, including liquid-water content, temperature and drop size. Other historical factors also would change NASA's course.

For instance, although Apollo 11, the first moon landing, occurred early in Richard Nixon's presidency, he disapproved of the U.S. human

spaceflight program. He refused to fund NASA at the 1960s level, but he did approve the start of NASA's space shuttle program.

In compliance with this executive order, NASA Administrator James C. Fletcher announced in 1972 that after a decade in which the moon was the primary focus of the U.S. space program, NASA now "...would empha-

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## Administrator addresses Ames employees at all hands

During a visit to Ames on March 17, 2014, NASA Administrator Charles Bolden addressed Ames staff at an all-hands and answered questions. At an afternoon media event, Bolden learned about SPHERES free-flying robots now on the International Space Station and visited the FutureFlight Central (FFC) for demonstrations of SARDA and ATD-1, components of the NextGen air traffic management system under development at Ames. Bolden is seen here, on the left (photo below) in the FFC with aerospace engineer Ty Hoang, right. Accompanied by Ames Deputy Center Director Lewis Braxton III, the administrator also lunched with Ames staff and met with interns as well as Ted Grabeff, an Ames



NASA photos by Eric James

wind tunnel engineer. Grabeff's recent homemade video response to queries about NASA and space from a boy in England attracted British media attention and garnered him a thank-you email from the NASA administrator for his effort. Bolden also addressed local media during a question-and-answer session (above photo).

## Students compete in mini-robot regional botball tournament

BY JAMES SCHWAB

The 2014 Northern California Regional Botball Tournament, co-sponsored by Ames was held April 12, 2014, at Independence High School in San Jose, Calif. Sixteen teams prepared autonomous designs and competed head-to-head in unrevealed challenges.

Botball tournament preparation starts months in advance with robotics research and design activities. Starting in January, students begin receiving and building their kits during two-day workshops in various regions of the U.S. In Northern California, the 2014 development process began in early February.

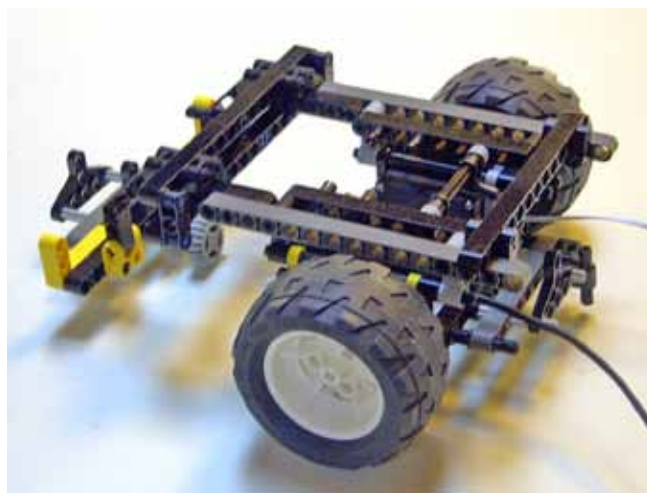
All participants are invited to attend a Global Conference on Education Robotics in the summer. These year-round activities take place in 17 regions throughout the world.

NASA scholarships have paid for the registration fees of more than 900

teams in the past six years. Approximately 48 percent of all teams received some type of scholarship from NASA, including smaller incentive scholarships.

"The Botball tournament is a great avenue for students to work as a team on solving problems through technology," said Mark Leon who heads the NASA Robotics Alliance Project at Ames. "What the students learn here is how the technology and the solutions they have created can be used in real-world situations. The tournament also expands and deepens their interest in math and science, and it's great that the students can directly interface with NASA in these areas," Leon said.

Participating cities in Northern



California include: East Palo Alto, Fremont, Hayward, Los Altos, Middletown, Oakland, Redding, San Francisco, San Jose and San Mateo.

For more information about the NASA Robotics Alliance Project and Botball, visit: <http://robotics.nasa.gov>



## Ames celebrates its history of planetary entry technology

BY RUTH DASSO MARLAIRE

By the end of World War II, a revolution in aeronautical research was near. Scientists and engineers at the Ames National Advisory Committee on Aeronautics (NACA) research laboratory were about to take a giant leap into a new era of transonic and supersonic aeronautics, of greatly increased speeds due to jet and rocket engines, and missiles.

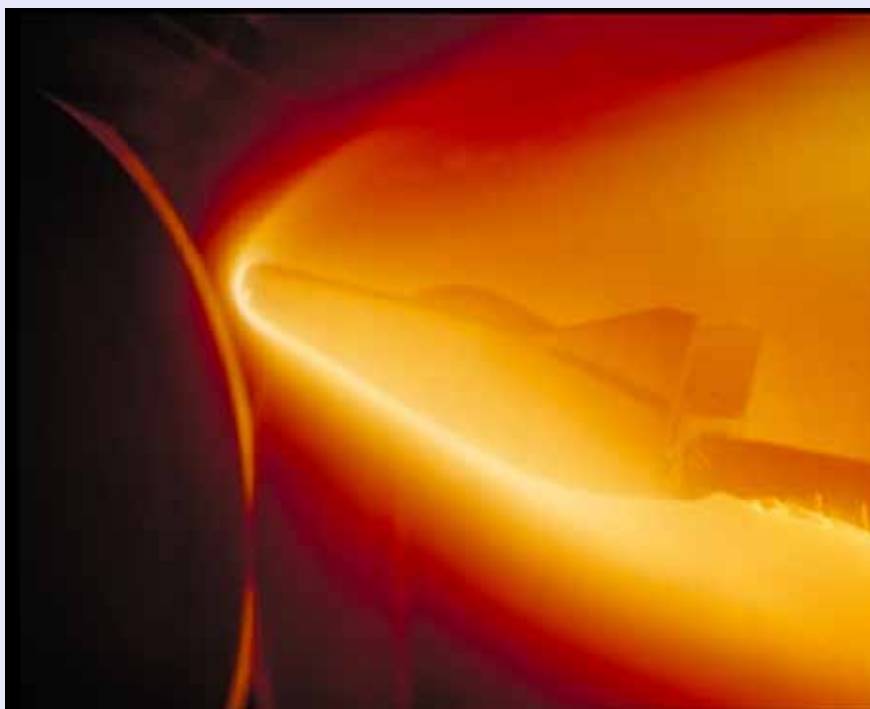
According to Edwin Hartman's "Adventures in Research," Ames broke new ground in all flight regimes early on, from subsonic to hypersonic, by developing sophisticated test facilities that rapidly advanced aeronautical research and methods of theoretical aerodynamics. One of the first facilities was a ballistic range designed and built by Ames engineers. Its purpose was to test the supersonic free-flight theories of its researchers. The experiment was simple; it used a 220 Swift rifle to launch a test model into still air. The gun produced muzzle velocities of about 4,000 feet per second, one of the fastest built at the time. The estimated ultimate velocity achievable from a rifle powered only by gunpowder was less than 10,000 feet per second. As aeronautic research progressed, it was clear that a testing facilities needed to change with the times; researchers knew that the flight of ballistic missiles, which reentered the atmosphere at speeds of 20,000 feet per second or more, could not be simulated by models launched with an ordinary gun.

This realization shifted the focus of aeronautic research from aerodynamics to the much more complex field of aerothermodynamics; the heat from high-speed aircraft became a matter of paramount importance to design engineers. At the time, researchers theorized that a missile traveling 7,000 miles per hour could generate air temperatures behind its bow shock wave as high as 8,000 degrees Fahrenheit, nearly as hot as the surface of the sun. They knew this heat could affect the flight of missiles. The aerothermodynamic processes were complex and not readily amenable to theoretical treatment. Thus, in this period of massive effort, experimental test facilities were developed to simulate the aerothermodynamic properties of hypervelocity flows. Today, these research laboratories at Ames have grown into

the Ballistic Range Complex and the Arc Jet Complex.

"We've come to appreciate that no one ground test method fully captures the awesome energies and complex physics that occur during atmospheric entry. Through a combination of brute power in the arc jet complex, clever

what is an arc jet? It's a laboratory where gases are heated and expanded to very high temperatures and supersonic/hypersonic speeds by a continuous electrical arc between two sets of electrodes. The gases (typically air) pass through a nozzle aimed at a test sample in vacuum, and flow over



NASA photo

M-2 lifting body being tested in Ames' atmospheric entry simulator to determine the areas of most intense heat, April 2000.

sub-scale testing in the ballistic range complex, and detailed theoretical and computational analysis, we are able to composite a comprehensive picture of what happens in actual flight," said Dean Kontinos, current chief of the Entry Systems and Technology Division at Ames.

The Ames Ballistic Range started its development in the 1940s, under the leadership of H. J. (Harvey) Allen, then chief of the Supersonic Free-Flight Division. Today, the complex is a unique facility that provides critical testing in hypervelocity aerodynamics, impact physics, flow-field structure and chemistry. It currently consists of three ranges: the Ames Vertical Gun Range, the Hypervelocity Free-Flight Facilities and the Electric Arc Shock Tube.

As demand grew for high-speed airplanes, aerothermodynamic research also grew in importance. To satisfy this requirement, Ames further developed the arc jet facility. But first,

it. Throughout the test process, data is collected on the response of the thermal protection materials designed to survive the harsh conditions.

The Arc Jet Complex consists of four facilities: the Aerodynamic Heating Facility, Turbulent Flow Duct, Panel Test Facility and Interaction Heating Facility. It produces critical data for developing thermal protection materials, validating material performance models, heat shield design and repairs, and ultimately for flight qualification. The large power of the system along with the versatility provided by the different facilities make the Arc Jet Complex unique in the world.

Finally, these breakthroughs were possible because of the exceptionally innovative engineering used at Ames to develop world-class space exploration technology. Many researchers believe that Alvin Seiff, more than any other person, was responsible for

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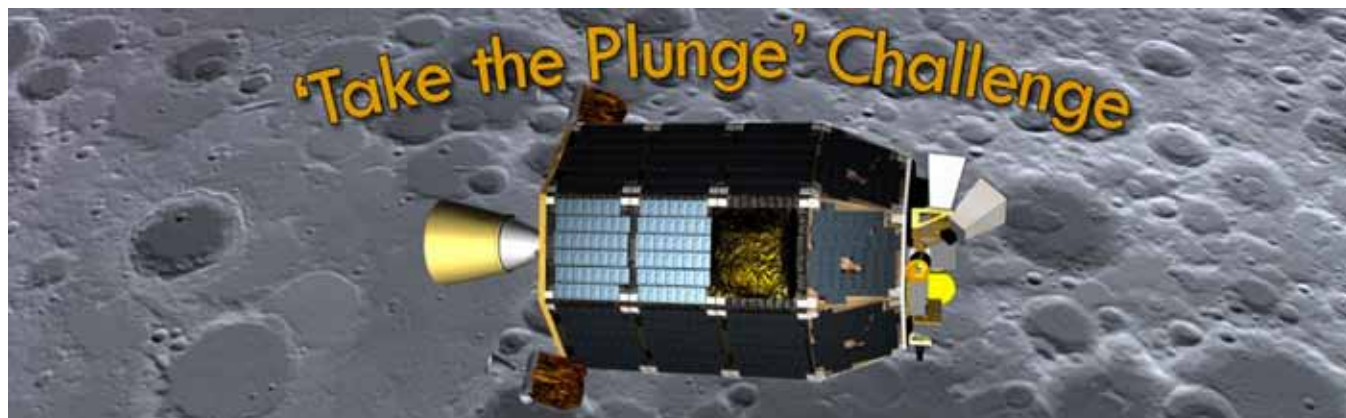
## Take the Plunge LADEE Impact Challenge

BY RACHEL HOOVER

NASA's Lunar Atmosphere and Dust Environment Explorer (LADEE) spacecraft is gradually lowering its orbital altitude over the moon. LADEE will continue to make important sci-

"Even if we perform all maneuvers perfectly, there's still a chance LADEE could impact the moon sometime before April 21, which is when we expect LADEE's orbit to naturally decay after using all the fuel onboard."

Oct. 6, 2013. On Nov. 10, LADEE began gathering science data, and on Nov. 20, the spacecraft entered its science orbit around the moon's equator. LADEE has been in extended mission operations following a highly success-



ence observations before its planned impact into the lunar surface April 2014.

NASA asked employees and the public for their best guesses as to when they think it would impact the lunar surface.

LADEE mission managers expect the spacecraft will impact the moon's surface on or before April 21, 2014. On April 11, ground controllers at Ames commanded LADEE to perform its final orbital maintenance maneuver prior to a total lunar eclipse on April 14-15, when Earth's shadow passed over the moon. This eclipse, which lasted approximately four hours, exposed the spacecraft to conditions just on the edge of what it was designed to survive.

This final maneuver ensured that LADEE's trajectory will impact the far side of the moon, which is not in view of Earth and away from any previous lunar mission landings. There are no plans to target a particular impact location on the lunar surface, and the exact date and time depends on several factors.

"The moon's gravity field is so lumpy, and the terrain is so highly variable with crater ridges and valleys that frequent maneuvers are required or the LADEE spacecraft will impact the moon's surface," said Butler Hine, LADEE project manager at Ames.

Anyone was eligible to enter the "Take the Plunge: LADEE Impact Challenge." Winners will be announced after impact and will be e-mailed a commemorative, personalized certificate from the LADEE program. The submission deadline was April 11.

"We want to thank all those that watched LADEE launch and have followed the mission these past months," said Jim Green, NASA's director for Planetary Science at NASA Headquarters in Washington. "Our moon holds a special place in so many cultures, and because of LADEE, we'll know more than ever before about our nearest neighbor."

LADEE's mission marked several firsts. It was the first demonstration of optical laser communications from space sending data six times faster than radio and the first deep-space spacecraft designed and built "in house" at Ames.

It also was the first payload to launch on a U.S. Air Force Minotaur V rocket integrated by Orbital Sciences Corp., Va., and was the first deep-space mission to launch from NASA's Goddard Space Flight Center's Wallops Flight Facility on Wallops Island, Va., when millions watched the night launch on Sept. 6, 2013.

The vending-machine-size spacecraft has been orbiting the moon since

ful 100-day prime science phase.

LADEE's three science payload instruments have been working to unravel the mysteries of the lunar atmosphere and dust environment, acquiring to date more than 700,000 measurements. In its previous orbit, LADEE's closest approach to the moon's surface was between 20 and 50 km, and its farthest point was between 75 and 150 km – a unique position that allows the spacecraft to frequently pass from lunar day to lunar night, approximately every two hours. This vantage provides data about the full scope of changes and processes occurring within the moon's tenuous atmosphere.

Scientists hope to address a long-standing question: Was lunar dust, electrically charged by sunlight, responsible for the pre-sunrise glow detected during several Apollo missions above the lunar horizon? LADEE also is gathering detailed information about the structure and composition of the thin lunar atmosphere.

A thorough understanding of these characteristics of our nearest celestial neighbor will help researchers understand other bodies in the solar system, such as large asteroids, Mercury and the moons of outer planets.

## Researchers discover origin of soil on small asteroids

BY RACHEL HOOVER

An international team of researchers from academic and government institutions, including NASA's Solar System Exploration Research Virtual Institute (SSERVI) at Ames has determined the likely origin for the loose material that covers small asteroids. Researchers found that rock weathering and fragmentation due to temperature changes caused by sunlight is the main process by which debris is generated on small asteroids. The findings were published in the April 10, 2014 issue of *Nature*.

Space missions and ground-based observations have shown that small asteroids, measuring about half a mile (or one kilometer) wide, are covered by a loose layer of dust and debris called regolith. Traditionally, scientists theorized the regolith on asteroids was the result of micrometeoroid impacts that pulverized large boulders or bedrock creating dust that fell back onto the asteroid's surface. This is the same way craters and regolith form on the moon. However, laboratory experiments and impact models now show that, unlike the moon, these small asteroids do not have enough gravity to keep the debris from escaping into space. Therefore, impact debris cannot be the main source of regolith on small asteroids.

"This insight will help us to interpret astronomical observations of asteroid surfaces in terms of the underlying bedrock, not contaminated by in-falling debris from elsewhere," said David Morrison, SSERVI chief scientist at Ames. "In other words, we should expect to see the same materials in the regolith that make up the larger boulders and rocks of an asteroid."

While performing experiments in the laboratory, researchers from Observatoire de la Côte d'Azur, Hopkins Extreme Materials Institute at Johns Hopkins University, Institut Supérieur de l'Aéronautique et de l'Espace and Southwest Research Institute (SwRI) used an X-ray scanner to measure the growth of cracks – or thermal fatigue – in different types of meteorites before and after a series of temperature cycles.

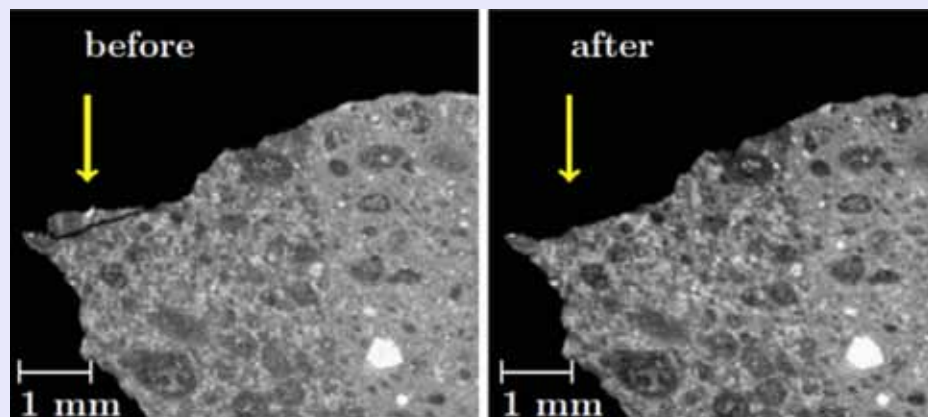
"We find that rocks larger than a few centimeters break up faster by thermal fragmentation induced by extreme temperature variations between day and night, than by micrometeoroid impacts," said Marco Delbo from the Observatoire de la Côte d'Azur

in Nice, France, and the paper's lead author.

The production of fresh regolith originating from thermal fatigue fragmentation may be an important process for rejuvenating the surface of near-Earth asteroids, as well as for

be covered by coarse regolith and pebbles, and therefore any potential capture mechanism must be able to cope with loose collections of coarse rocks.

Managed from Ames, SSERVI is a virtual institute that brings research-



*Photos courtesy of Observatoire de la Côte d'Azur in Nice, France*

*Scientists measure the growth of cracks – or thermal fatigue – in different types of meteorites before and after a series of temperature cycles.*

explaining the observed shortage of fragile carbonaceous-type near-Earth asteroids that pass close to the sun.

"The sun acts like an oven; it heats up space rocks producing internal stresses that, over time, break them apart," said Simone Marchi SSERVI researcher at the Southwest Research Institute and co-author of the paper.

This model predicts that asteroids on the order of several yards in size, such as those that may be targets of future sample return missions, could

ers together in a collaborative virtual setting. The virtual institute model enables cross-team and interdisciplinary research that bridges science and exploration. SSERVI is jointly funded by the Science Mission Directorate and Human Exploration and Operations Mission Directorate at NASA Headquarters in Washington.

For more information about SSERVI and selected member teams, visit: <http://sservi.nasa.gov>

## Ames planetary entry technology

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developing the concept of using entry probes to reconstruct the properties of planetary atmospheres. He proved his concept with a series of flight-tests in the 1960s, called the Planetary Atmospheric Entry Test (PAET), which consisted of dropping fully instrumented probes into Earth's atmosphere from a helicopter, airplane and balloon. He served as principal investigator for the atmospheric structure experiments on the Pioneer Venus and Galileo missions, which explored the atmospheres of Venus and Jupiter, respectively.

Ames has a long tradition of leadership in developing and applying technologies to enable high-speed entry from space. Both facilities have provided critical testing in support of

many of NASA's Space Transportation and Planetary Programs including: Mercury, Gemini, Apollo, Shuttle, Viking, Pioneer Venus, Galileo, Cassini, Stardust, Mars Odyssey, Mars Exploration Rovers, Mars Science Laboratory, International Space Station and National Aerospace Plane. The Arc Jet Complex also supported Mars Pathfinder, Stardust, NASP, X-33, X-34, SHARP-B1 and B2 and X-37.

In the fields of planetary exploration and planetary probe technology, Ames researchers have made some impressive contributions to America's space program. Research provided by these facilities have made Ames the agency's lead center for entry technology.



## Ames - 75 years of world leadership in science and technology

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John F. Parsons (left) and Ferril R. Nickle (right), first members of the Ames staff, standing in front of a construction building, Jan. 29, 1940.



Russell Robinson, assistant director joining the Ames staff in Jan. 1, 1950, is seen here (far right) supervising the first excavation for the Ames Laboratory during the groundbreaking ceremony, Dec. 20, 1939. Robinson was instrumental in establishing the Ames site as a liaison of the NACA Special Subcommittee for the Future Research Facilities and was the on-site representative of the construction group.



Aerial shot of Moffett Field and surrounding area, 1938 (Photo: Navy)



NASA photos

A construction shack (which is now adjacent to Building N203) Jan. 29, 1940.

## Atmospheric science: NASA Ames' early contribution to our home planet (part one)

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size Earth-orbital programs geared to intensive study of our homeland in the cosmos, the planet Earth..." As a consequence, the government would fund the more practical environmental programs.

One of the first environmental programs NASA participated in was the Climatic-Impact Assessment Program (CIAP). Funded by the Department of Transportation, it would assess the effects of proposed high-flying aircraft on the environment. At the time, supersonic transports (SSTs) and space shuttles were granted permission for future flight entry into our open skies. But no one knew the effects of such engine emissions on Earth's atmosphere. In support of this program initiative, planetary scientists at Ames assumed the role of were they really studying climate, or just atmospheric conditions in a more immediate time-frame to study Earth's atmosphere.

With funding from CIAP and the National Science Foundation, Ames research scientists James B. Pollack and Brian Toon initiated studies that showed these stratospheric flights should have no significant change on Earth's climate, providing they operated at projected traffic levels for the next several decades. Their one caveat was that the SST's effects should be reevaluated when in operation.

Studying Earth's atmosphere soon became a pragmatic concern, and Ames scientists continued to meet the challenge by developing sophisticated computer simulations of aerosols in the stratosphere and their effect on climate. These models were used later to analyze the sulfuric acid clouds of Venus and windblown Saharan dust.

By this time, there was a growing demand for flight expeditions, which effectively augmented the fleet of research aircraft at Ames. One such addition was due to the final planning phase of the Earth Resources Technology Satellite (ERST) program. ERST-1, or what became known as LandSat-1, was NASA's first unmanned satellite specifically dedicated to multispectral remote sensing. NASA researchers became concerned that they would have trouble analyzing satellite data due to atmospheric distortions. However, if high-altitude photography and remote sensing from above the densest part of Earth's atmosphere

could be obtained, researchers could use this data to analyze the satellite data. So NASA asked the U.S. Air Force for its two soon-to-be surplus, high-flying U-2 reconnaissance aircraft. After some negotiations, Ames was given the responsibility of managing and operating these special planes. NASA's successful acquisition of the two U-2 aircraft encouraged other scientists to propose other flight research plans. LandSat-1 launched in 1972.

In the early days, 1960s, Jim Pollack and James E. Hansen, the former director of NASA's Goddard Institute for Space Studies (GISS), were good friends. Hansen had met Pollack and Carl Sagan at planetary meetings. "We both had a strong interest in ... comparative planetology, the contrasting effects of Mars, Earth, Venus, and the different magnitudes of their greenhouse effect," said Hansen in an

email to the author. They also were quite interested in volcanoes, their effect on climate and using volcanoes to test their understanding of climate. When Hansen published a 1978 paper entitled "Mount Agung Eruption Provides Test of a Global Climatic Perturbation," in the journal *Science*, the NASA administrator read it and told the NASA chief scientist that NASA should have a program to be ready for the next large eruption, per the paper's suggestion. "Jim [Pollack] turned out to be the beneficiary, as Ames started a program of aircraft observations," said Hansen.

Later that year, the Ames Climate Office (ACE) was established, which started to design, plan and execute future atmospheric research expeditions. (This is the first part of a two-part article. The second part will be published in the next issue of the *Astrogram*.)

## AAAG presents "Invictus," tribute



NASA photo by Dominic Hart

On Jan. 15, the African American Advisory Group (AAAG) presented, "Invictus: A Celebration of the Life and Legacy of Martin Luther King, Jr. and Nelson Mandela" in the Syvertson Auditorium. Ames staff, family and friends were invited to attend the performance by TABIA African American Theatre Ensemble in celebration of Martin Luther King, Jr. and Nelson Mandela. Tabia is a San Jose-based African American theatre ensemble that presents the contributions and culture of African Americans through poetry, storytelling, song and dance with talented local performers. From left to right, from TABIA are: Postoria Aguire (portrayed Dr. King); Jeff Jones (recited Mandela's speech); Cheryl Scales (vocalist); and Viera Whye (drummer).



## Ames' exhibits draws crowds at state capitol building

NASA photos by Dominic Hart



Ames exhibit tent in front of the state capitol building in Sacramento for California Aerospace Week March 24-25, 2014.



Above: Sacramento students load and deploy Chipsats from the Kicksat. The Kicksat is a small satellite the size of a loaf of bread. Each Chipsat is a complete satellite smaller than a dinner cracker. More than 100 Chipsats are deployed from the Kicksat and capture data about magnetic and atmospheric data in low-earth orbit. Right: Students explore the other science exhibits in the NASA tent in front of the state capitol building in Sacramento.

The American Institute of Aeronautics and Astronautics (AIAA) sponsored the third annual California Aerospace Week in Sacramento, March 24-26, 2014 featuring panels, exhibits, hearings and discussions, highlighting the importance of aerospace.

The week began with recognition on the assembly and senate floor. Ames Center Director S. Pete Worden represented NASA at the "Launch California: Leading the Nation into Space" hearing in front of the Assembly Select Committee on Aerospace and Senate Select Committee on Defense and Aerospace. David McBride, Armstrong Flight Research Center director, gave a presentation entitled "A Vision for the World of Flight."

Eighteen volunteers from Ames engaged more than 1,000 visitors from area schools and the state legislature. Ames highlighted the center's work in the environment, airborne Earth science, 3-D manufacturing, small satellites, space biosciences, autonomy, robotics and Ames missions.

Exhibits included three NASA Dragon Eye unmanned aerial Systems, a model of the Lunar Atmosphere and Dust Environment Explorer (LADEE), 3-D manufacturing demonstration, Kicksat, SporeSat, Synchronized Position Hold, Engage, Reorient, Experimental Satellites (SPHERES), planetary sustainability and education outreach.



Ames Center Director S. Pete Worden (left) and David McBride director of NASA's Armstrong Flight Research Center, visit NASA exhibits at the California Aerospace Week in Sacramento, Calif.



Ames Deputy Center Director Lewis Braxton III (right) accepts proclamation from Assemblyman Rich Gordon.





## Tom Pierson, founder of the SETI Institute, passes away



Tom Pierson

It is with sadness that we report the death of our friend and colleague, Tom Pierson. Tom has always been a friend and supporter of the work we do here at Ames for NASA. He has also been a friend, mentor and supporter to many of us here at Ames. There were numerous times in the past few years when even while not feeling his best, he supported the many discussions, meetings and conferences that helped

us to further the important and critical research and work being done for exploration of our solar system. Just as the old proverb says for families, it takes a village to nurture and support a successful idea or project at NASA. In Tom's passing, we have lost one of our village elders.

Tom, who founded the SETI Institute and went on to become its Chief Executive Officer for most of the organization's first 30 years, died on Feb. 20, 2014. He had been on medical leave since 2012.

Growing up in Norman, Okla., Tom studied aerospace engineering at the University of Oklahoma. By the early 1980s, Tom was working as an administrator at San Francisco State University when he learned of the new SETI project headquartered at Ames, an hour's drive to the south. Intrigued, he made a proposal to project participants Barney Oliver, John Billingham and Jill Tarter, suggesting a more efficient way to organize the NASA efforts.

Tom laid out the benefits – both organizational and financial – of setting up a non-profit entity, dedicated to SETI research. In this way, the admin-

istrative and other costs associated with the project could be kept low, and more of the budgeted monies could go to science. Finding broad agreement with his idea, Tom completed the paper work in the fall of 1984, at which point the SETI Institute became a reality.

For his extensive contributions to furthering the field of astrobiology, Tom was recently recognized with NASA's Distinguished Public Service Award, the highest honor given by the agency to non-government employees. The citation reads: "For distinguished service to NASA and the scientific community through leadership of the SETI Institute, supporting basic research and education dealing with life in the universe."

Tom is survived by his wife, Elyse, his daughter Elizabeth and son Thomas, and a son by a previous marriage.

Read more about Tom's life at the SETI website: <http://www.seti.org/thomas-pierson-1950-2014>

## "The New Black" depicts civil rights issues

The Ames African American Advisory Group (AAAG) and Lesbian Gay Bisexual Transgender Advisory Group (LGBTAG) hosted a screening of the film "The New Black" in February in the Syvertson Auditorium.

The film is a documentary that tells the story of how the African American community is grappling with the gay rights issue in light of the recent gay marriage movement and the fight over civil rights.

The film documents activists, families and clergy on both sides of the campaign to legalize gay mar-

riage and examines homophobia in the black community's institutional pillar—the black church.

"The New Black" takes viewers into the pews and onto the streets as it tells the story of the historic fight to win marriage equality in Maryland and charts the evolution of this divisive issue within the black community.

A trailer for the film can be viewed here: <http://www.newblackfilm.com/trailer/>



NASA photos by Dominic Hart



Group photo right: At the showing of "The New Black" film at Ames, Thomas Squire (Chair, Lesbian Gay Bisexual Transgender Advisory Group); Kevin Jones; Aisha Bowe (Chair, African American Advisory Group), Monica Anderson (founder, Spectrum Queer Media and "The New Black" screening producer) and Ames Center Director S. Pete Worden. Far right photo: Blackberri (actual legal name) introduces the showing of the film.

## Kristin Yvonne Rozier wins Women in Aerospace award



*photo provided by Ann Patterson-Hine*  
Kristin Yvonne Rozier, winner of Women in Aerospace's Inaugural Initiative-Inspiration-Impact Award, at the award's ceremony in Arlington, VA.

Women in Aerospace (WIA) named Kristin Yvonne Rozier the winner of its Inaugural Initiative-Inspiration-Impact Award in October 2013. This prestigious award is presented for an individual in her early career, who consistently surpasses expectations from a technical, interpersonal and management perspective, com-

mitment to professional growth, and service as a role model or mentor that shows dedication to the advancement of women in aerospace.

Her citation for this award reads: "For exemplary achievement of formal specification, verification and validation of a NextGen air traffic control system candidate and for dedication as a mentor and role model."

The work referenced in the award citation was the result of a collaboration with Yang Zhao and NASA's Airspace Systems Program. Rozier and her team modeled, specified and rigorously mathematically analyzed the system-level logic for the Automated Airspace Concept (AAC), which ensures safe separation between aircraft, the primary consideration in air traffic control.

They adapted state-of-the-art design-time formal verification techniques to ensure there are no potentially catastrophic design flaws remaining in the AAC design before the next stage of production. This method of rigorous verification and validation performed

early in the design stage of NASA's complex safety-critical systems leads to dramatic savings in terms of both debugging time and cost while helping NASA produce exceptionally safe, reliable systems.

Rozier frequently volunteers as a public speaker, mentor, technical recruiter, and judge for activities such as science fair projects and technical writing. Her accomplishments cited for this WIA award include founding an annual Intelligent Systems science fair award, now in its fourth year.

She was honored at the 28th annual Women in Aerospace Awards Dinner and Ceremony on Oct. 29, 2013, at the Ritz Carlton Hotel in Arlington, Va. Her acceptance speech thanked the many people who enabled her path to an interdisciplinary career applying theoretical computer science in the aeronautics domain, focusing on automated techniques for the formal specification, validation and verification of safety critical systems.

Rozier is a research computer scientist in the Intelligent Systems Division at Ames. More information about her awards and news coverage can be found at: <http://ti.arc.nasa.gov/profile/kyrozier/>.

## Ames premieres "Manya: The Living History of Marie Curie"

The Ames Women's Influence Network (WIN) invited Ames employees to the NASA premier of "Manya: The Living History of Marie Curie," March 25 in the Syvertson Auditorium. This is a one-woman theatrical production portraying the struggles and triumphs of Marie Curie — an academically impassioned, intensely private, fervently Polish scientist, wife, mother and teacher who became the first European woman to earn a doctorate in the sciences, first woman to lecture at the University of Paris and first person to win two Nobel Prizes.

As the world's most preeminent female scientist, Marie Curie (née Maria Skłodowska) changed the course of history through her discovery of radium and radioactivity. This theatrical production explores the tenacity of the human spirit and the enduring



*NASA photo by Eric James*

Susan Marie Frontczak as Marie Curie during her recent performance at Ames in March.

allure of scientific discovery. It is written, directed and performed by Susan Marie Frontczak and produced by Jen Myronuk and Susan Marie Frontczak. A trailer can be viewed at: <http://www.storismith.org/manya/vc.html>. For additional information, see: <http://storismith.org/manya/pd.html> or <https://www.facebook.com/MarieCurieLivingHistory>

storysmith.org/manya/vc.html. For additional information, see: <http://storismith.org/manya/pd.html> or <https://www.facebook.com/MarieCurieLivingHistory>



## Yvonne Pendleton receives 2014 Women of Influence Award

BY TEAGUE SODERMAN, SSERVI STAFF

Yvonne Pendleton, director of NASA's Solar System Exploration Research Virtual Institute (SSERVI) at

Since joining NASA out of college in 1979, she has served in various other roles including senior advisor for research and analysis programs

She attended Georgia Institute of Technology, under NASA-sponsored programs, she obtained a master's degree in aeronautics and astronautics from Stanford University (1981) and a Ph.D. in astrophysics from the University of California at Santa Cruz (1987).

Other honors and activities included: Competitively selected for Federal Government Senior Executive Service, 2007-present; Elected Fellow, California Academy of Sciences; and volunteer at Hope's Kitchen, Mountain View, Calif.



NASA photo

NASA Ames' Yvonne Pendleton, director of NASA's Solar System Exploration Research Virtual Institute (SSERVI) at NASA's Ames received the Silicon Valley Business Journal 2014 Women of Influence Award April 4, 2014.

Ames received the Silicon Valley Business Journal 2014 Women of Influence Award, April 4, 2014.

The award program shines the spotlight on local businesswomen, community leaders and philanthropists who are remaking Silicon Valley.

Pendleton currently directs SSERVI, a virtual institute focused on solar system science and exploration with an operational budget of \$13 million per year. It is based on the principle articulated by the late Mike Wargo, chief scientist for human exploration, that "science enables exploration and exploration enables science."

From 2010-2013, she also served as the director of the NASA Lunar Science Institute, which was based on the successful business model of the NASA Astrobiology Institute (NAI).

From 2007-2008, she oversaw \$1.2 billion in research and analysis programs from NASA's four science divisions (astrophysics, planetary science, helio physics and earth sciences) and led a team that managed the nearly \$50 million investments in education and public outreach activities, including those from NASA's science missions.

Pendleton has contributed significantly to our understanding of the origin and evolution of organic material in the universe. The International Astronomical Union named Asteroid 7165 Pendleton after her.

for the Science Mission Directorate at NASA Headquarters.

## Harrison Ford flies Alpha Jet at Ames

Actor Harrison Ford recently visited Ames to interview scientists and researchers studying the effects of climate change on Earth. He's seen here in the Alpha Jet at Ames (photos below) which he went along for a flight in and seen here to the right speaking about Ames with Center Director S. Pete Worden. Ford also viewed climate data on the NASA Advanced Supercomputer facility's hyperwall-2. Ford is one of the hosts of the premiere episode of a Showtime documentary series entitled "Years of Living Dangerously."



NASA photos by Eric James

## Ombuds Office services available to Ames personnel

The Ames Ombuds Office provides all civil servants, contractors and students at the center with a supplemental, confidential and infor-



*John (Jack) Boyd, Ames Ombud*

mal channel of communication to raise significant issues and concerns that they perceive could impact safety,

organizational performance or mission success.

The Ombuds is accountable for conducting informal inquiries, raising issues of concern to appropriate officials and redirecting matters not under the Ombuds' realm to the appropriate office or organization with an existing administrative system; for example, the Inspector General, the Office of Equal Opportunity and Diversity, Ames Federal Employees Union, Procurement Ombuds, Chief Counsel and Human Resources.

The Ombuds' power rests on their reputation for confidentiality, fairness, objectivity, tact and respectful concern for the welfare of all individuals of the NASA community and for the well-being of the agency.

John (Jack) Boyd continues to serve as Ames Ombuds. Jim Arnold serves as the alternate Ames Ombuds. They can meet you at a location of your choice. You also can work with an Ombuds at another center.

The Ombuds office is located in Building 200, room 205, Mail Stop 200-1A. Boyd can be reached at



*Jim Arnold, alternate Ames Ombud*

ext. 4-5222 or at email: [john.w.boyd@nasa.gov](mailto:john.w.boyd@nasa.gov), and Arnold can be reached at ext. 4-5265 or [james.o.arnold@nasa.gov](mailto:james.o.arnold@nasa.gov).

The Ombuds website is <http://insideames.arc.nasa.gov/life-ombuds-office.php>

## Italian aerospace industry delegation visits Ames



*Visitors from the Turin (Italy) aerospace industry delegation listen to Jon Bader (far left) talk about the Unitary Plan Wind Tunnel during a recent visit to the center.*

*NASA photo by Dominic Hart*



## Ames ongoing monthly events calendar

**African American Advisory Group (AAAG) Mtg.**, last Tuesday of each month, 12 - 1 p.m., Bldg. N-255, Rm. 101C. POC: Rose King, ext. 4-3442.

**Moffett Aikido Club**, Monday and Wednesday evenings, 6:30 p.m., Bldg. 944. Aikido is a non-competitive, defensive martial art known as the "Way of Harmony." POC: Diane Pereda (650) 575-9070 or Robert Dean (650) 787-1007, email: mfaikido@aol.com

**Ames Amateur Radio Club**, third Thursday of each month, Noon, N-T28 (across from N-255). POC: George Tucker, at ext. 4-2200.

**Ames Bluegrass Club**, every Tuesday from 11:30 a.m. to 1 p.m. in Bldg. 944. Players of all instruments and all levels are welcome, but we are particularly interested in experienced players willing to help improve the group's musical skills. POC: Bob Haberle at ext. 4-5494 or email: robert.m.haberle@nasa.gov

**Ames Bocce Ball Club**, Ames' newest Exchange-sponsored club is seeking members. POC: Mike Lindsay email: michael.c.lindsay@nasa.gov

**Ames Bowling League**, Fourth Street Bowl in San Jose. Need regular and substitute bowlers. For sign up questions: Michael Hom at ext. 4-0302 or Mina Cappuccio at ext. 4-1313.

**Ames Contractor Council Mtg.**, first Wednesday of each month, 11 a.m., Bldg. N-200, Committee Room. POC: Herb Finger at ext. 4-6598.

**Ames Federal Employees Union (AFEU) Mtg.**, third Wednesday of each month, noon. Bldg. N-204, Rm. 101. Guests welcome. Check for schedule changes at: <http://www.afeu.org>. POC: Paul K. Davis, ext. 4-5916.

**Ames Golf Club**, Members have the opportunity to play approximately 13 tournaments per year at a variety of 18-hole golf courses in the Bay and Monterey Area. POC: Barry Sullivan: Barry.T.Sullivan@nasa.gov.

**Ames Green Team** (formerly the Green Ames Working Group) meetings are held the first Tuesday of each month in Bldg. N-237, Rm. 101, from 10-11 a.m. POC: Roger Ashbaugh, Ames Environmental Management Division, ext. 4-5660. Web: <http://environmentalmanagement.arc.nasa.gov/reports/eo-13514.html>

**The Hispanic Advisory Committee for Excellence (HACE) Mtg.**, first Thursday of each month, 11:30 a.m. - 12:30 p.m., Bldg. N-255, Rm. 101C. POC: Jeanette Zamora, jeanette.zamora-ortega-1@nasa.gov.

**Ames Jazz Band Club**, Bldg. 944, 5:30 p.m. - 7 p.m. POC: Ralph Bach, email: ralph.e.bach@nasa.gov

**Jetstream Toastmasters**, Mondays, 12 p.m. - 1 p.m., Bldg. N-269, Rm. 179. POC: Tim Steiger, ext. 4-0195, tim.steiger@nasa.gov. Web: <http://jetstream.freetoasthost.com>

**Ames Nimble Knitters Club**, every Tuesday at 11:30 a.m., Bldg. N210, Rm. 141. POC: Rosalyn Jung, knifan2@yahoo.com or Diane Alexander at ext. 4-3140. Web: <http://knit.arc.nasa.gov>

**Ames Roller Hockey Club**, meets daily from noon to 1 p.m. at rink on north end of the 80-foot-by-120-foot wind tunnel. Players should have experience skating and must wear protective equipment. POC: James Prunty, james.a.prunty@nasa.gov

**Ames Safety Committee**, third Thursday of each month, 10 a.m. - 11 a.m., Bldg. N-237, Rm. 200. POC: John Livacich, jlivacich@mail.arc.nasa.gov, ext. 4-3243.

**Women's Influence Network (WIN)**, first Wednesday of each month, Bldg. N-232, Rm. 227, 12:00 - 1:00 p.m., POC: Wendy Holforty, wendy.l.holforty@nasa.gov

## Exchange Information

Information about products, services and opportunities provided to the employee and contractor community by the Ames Exchange Council. Visit our web site at: <http://exchange.arc.nasa.gov>

**Beyond Galileo Gift Shop N-235 in the cafeteria**, 8 a.m. - 2 p.m., ext. 4-6873

**Visitor Center Gift Shop (Exploration Center)**, Tues-Fri, 10 a.m. - 4 p.m., Sat. - Sun, 12 - 4 p.m., ext. 4-5412

Remember to purchase your baby shower, birthday and holiday gifts at Ames' two gift shops!

**Mega Bites Cafeteria N-235**, 6 a.m. - 2 p.m., ext. 4-5969/Catering ext. 4-2161

**Barcelona Café, Bldg. 3**, 6:30 a.m. - 2 p.m., ext. 4-4948/Catering ext. 4-4948

See daily menus at: <http://exchange.arc.nasa.gov/cafe/menu.html>

**Moffett Field Golf Club with 'Tee minus One' Grill and Sports Bar**. Catering available. Call (650) 603-8026. Extended Happy Hour Thursdays, \$5 and \$6 pitchers of beer starting at 4 p.m. - 8:30 p.m.

**RV Lots available**. Call to reserve a space at (650) 254-1808.

Civilian/Contractors, \$50/mo; military \$25/mo

**NASA Lodge (Bldg. 19)** (650) 603-7100

Where to stay when you're too tired to drive home? What about the lodge?! Two types of rooms: Bldg. 19 (43 rooms), rate: \$65/night (\$5 ea add'l adult); Bldg. 583 A&B (150 rooms), rate: \$55/night (\$5 ea. add'l adult); B547 rate \$60/night (for large groups)

**Ames Swim Center (N-109)** (650) 603-8025

The swimming pool is now open. Hours of operation are as follows (lap swim only):  
MWF 10 a.m. - 1 p.m.  
MWF 3 p.m. - 6 p.m.  
TTH 10 a.m. - 1 p.m.  
TTH 4 p.m. - 7 p.m.  
The pool is heated year round. The pool normally is available for lap swim, pool parties and special events. POC: Ryan Storms, pool manager (650) 603-8025. Memberships: single memberships: \$60/yr. Family memberships: \$80/yr. After purchasing a membership, there is an entrance fee: daily entrance fee - \$3/day or lap pass fee - \$50 for 20 uses. Platinum membership - \$380/yr. (no daily fee). Special events include military training, swim team events, kayak role practice, etc. The cost for special events is \$75/hr, or \$50/hr for military.

**Exchange basketball gym is now open, Bldg. 2** (650) 603-9717

Hours of operation:  
M-F 11 a.m.-1:30 p.m.  
M-F 4 p.m.-7 p.m.

**Chase Park reservations**, call ext. 4-4948  
**NACA Park reservations**, call ext. 4-4948

## Ames Cat Network

The Ames Cat Network needs help finding homes for cats trapped at Moffett. They range from feral to abandoned/lost pets. They are tested, altered and inoculated. Call Iris at ext. 4-5824 if you or someone you know are interested in fostering or adopting a cat.

## Ames emergency announcements

To hear the centerwide status recording, call (650) 604-9999 for information announcements and emergency instructions for Ames employees. You also may listen to 1700 KHz AM radio for the same information.

## “Refine Your Pitch” Workshop

Sustainable Silicon Valley hosts “Refine Your Pitch Workshop,” at Microsoft, Sunnyvale, April 30, at 2:00 - 5:30 p.m. Sustainable Silicon Valley and NASA Ames have partnered to seek scalable, game-changing solutions for planetary sustainability.

On April 30, you can learn how to pitch your solution to managers, venture capitalists and customers at Microsoft, Silicon Valley, from 2:00 - 5:30 p.m. This workshop is free for the contributors to the Call for Solutions Competition.

All innovators, whether from a large or small enterprise, are welcome to take advantage of this opportunity.

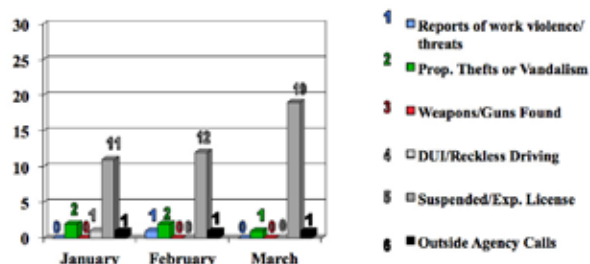
Round two: Call for Solutions is coming in May. The 2014 WEST Summit event, featuring the solutions, will be held in October.

Visit: [www.sustainable-sv.org/ssv2013/index.php](http://www.sustainable-sv.org/ssv2013/index.php) or <https://www.eventbrite.com/e/refine-your-pitch-workshop-tickets-11089504005>

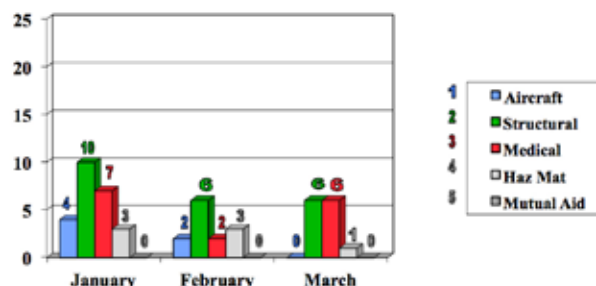
## Protective Services monthly activity

A statistical summary of activities of the Protective Service Division's Security/Law Enforcement and Fire Protection Services units for the three-month period ending March 2014 is shown below.

**Protective Services Office – Activities  
Security/Law Enforcement Monthly Activity Report**



**Protective Services Office – Activities  
Fire Protection Services**



National Aeronautics and Space Administration

**Ames Research Center**  
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